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THE HEMPSTEAD PLAINS OF LONG ISLAND*

BY ROLAND M. HARPER

There is in the western third of Long Island, within an hour's journey by rail from New York, about fifty square miles of dry land which was treeless when the country was first settled, and a considerable part of this can still be seen in its natural condition. This prairie, known locally as the "Hempstead Plains," is mentioned in a few historical and descriptive works, but long before geography became a science it had ceased to excite the wonder of the inhabitants, few of whom at the present time realize that there is not another place exactly like it in the world.

My attention was first called to it by the following statement in the U. S. Department of Agriculture's Soil Survey of the "Long Island area," by J. A. Bonsteel and others:†—"The . . . Hempstead plain is notable in being a natural prairie east of the Allegheny Mountains. In its natural state it bears a rank growth of sedge grass. It was treeless when first discovered and was originally used as commons for the pasturage of cattle and horses belonging to individuals and to communities." The

* This paper was originally read before the Association of American Geographers, December 31, 1909, and published in abridged form in the Brooklyn Standard-Union for January 16, 1910, and in full, with five illustrations, in the Bulletin of the American Geographical Society (43: 351-360) for May, 1911. On account of its local botanical interest, and in view of the fact that the periodicals named reach very few of the readers of TORREYA, and that the area is rapidly being developed by real estate companies, we have obtained permission from the American Geographical Society to use it in TORREYA. The author has here eliminated some passages which do not immediately concern botanists, and supplied an entirely new set of illustrations, none of which have ever been published before.—ED.

† Field Operations of the Bureau of Soils for 1903, p. 99; or p. 13 of the "advance sheets" for this particular area, published in January, 1905. A somewhat similar statement occurs 27 pages farther on.

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same thing has been mentioned incidentally in the catalogues of Isaac Hicks & Son, nurserymen of Westbury, L. I., and in "Long Island Illustrated," an attractive booklet issued annually by the Long Island Railroad.

For a generation or more the Hempstead Plains have been known to a few botanists as a good collecting ground, and every one who has traveled by rail from New York to Cold Spring Harbor, since the establishment of the Brooklyn Institute's biological laboratories at the latter place, has passed through several miles of what was once prairie, and seen a little which is



FIG. 1. Prairie scene about 3 miles south of Hicksville, *Quercus prinoides* in foreground, *Quercus minor* at left, *Betula populifolia* near center. August 25, 1909.

still in its natural condition; but to this day the real nature of the area in question has apparently never been mentioned in botanical literature. Previous to the summer of 1907 I had been along the edges of the area, as defined by Bonsteel, in several places, and penetrated into it for short distances, without seeing any natural vegetation, so I supposed that the prairie was all occupied by villages, private estates, farms, etc., and that it was consequently no longer possible to verify the published statements about its original vegetation. But one day in July of that year I happened to cross the center of the area on foot, and was surprised to find that there are still thousands of acres

on which *the flora is practically all native*. This is pretty good evidence that such areas have not only never been artificially deforested, but also never been touched by the plow. Where the sod is once broken a very different flora, consisting largely of European weeds, comes in, so that areas which have ever been cultivated can be distinguished at a glance. The same is true to some extent of areas that have been too closely grazed.

The prairie occupies the central portion of Nassau County, about midway between the north and south shores of the island. Like the pine-barrens of Suffolk County, a few miles farther

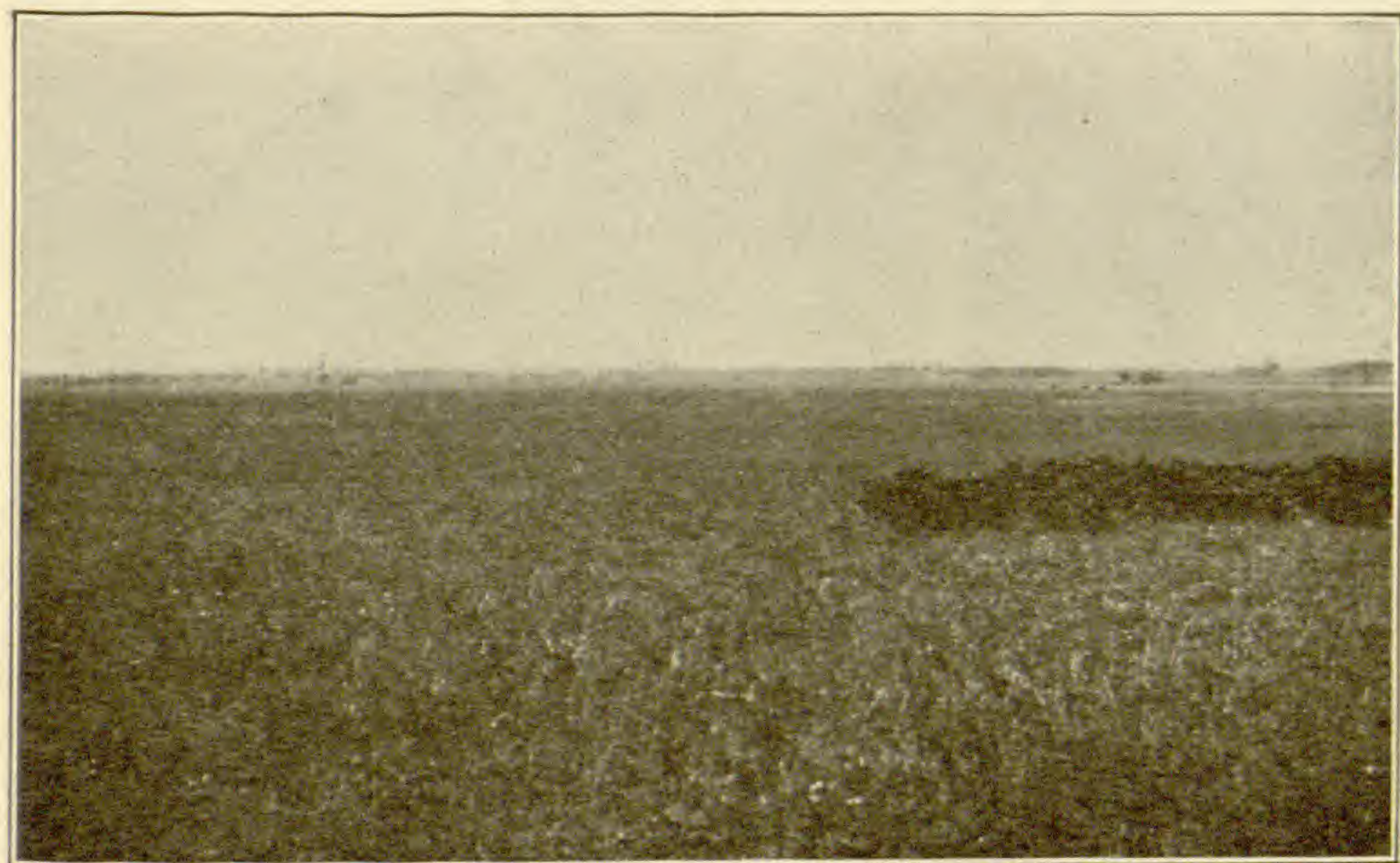


FIG. 2. Looking westward across the dry valley of Hempstead Brook toward Garden City, *Myrica carolinensis* at edge of valley in right foreground. Sept. 29, 1909.

east,* it lies entirely south of the latest terminal moraine (the Harbor Hill moraine), but partly overlaps or dovetails into the older of the two Long Island moraines (the Ronkonkoma moraine). Originally it extended westward to where Floral Park now is, and eastward to Central Park, a distance of about twelve miles, and had its greatest breadth from north to south, about seven miles, very near its eastern end. North of the straight main line of railroad from Floral Park to Hicksville, and also

* See TORREYA 8: 2. 1908.

west of Garden City and Hempstead, the original prairie vegetation has been almost totally obliterated; but a little south of Hicksville there are still a few places where one could describe a circle a mile in diameter without including a tree or a house or a field. Probably about one fifth of the original prairie area is still in its natural condition, except for being intersected by roads.

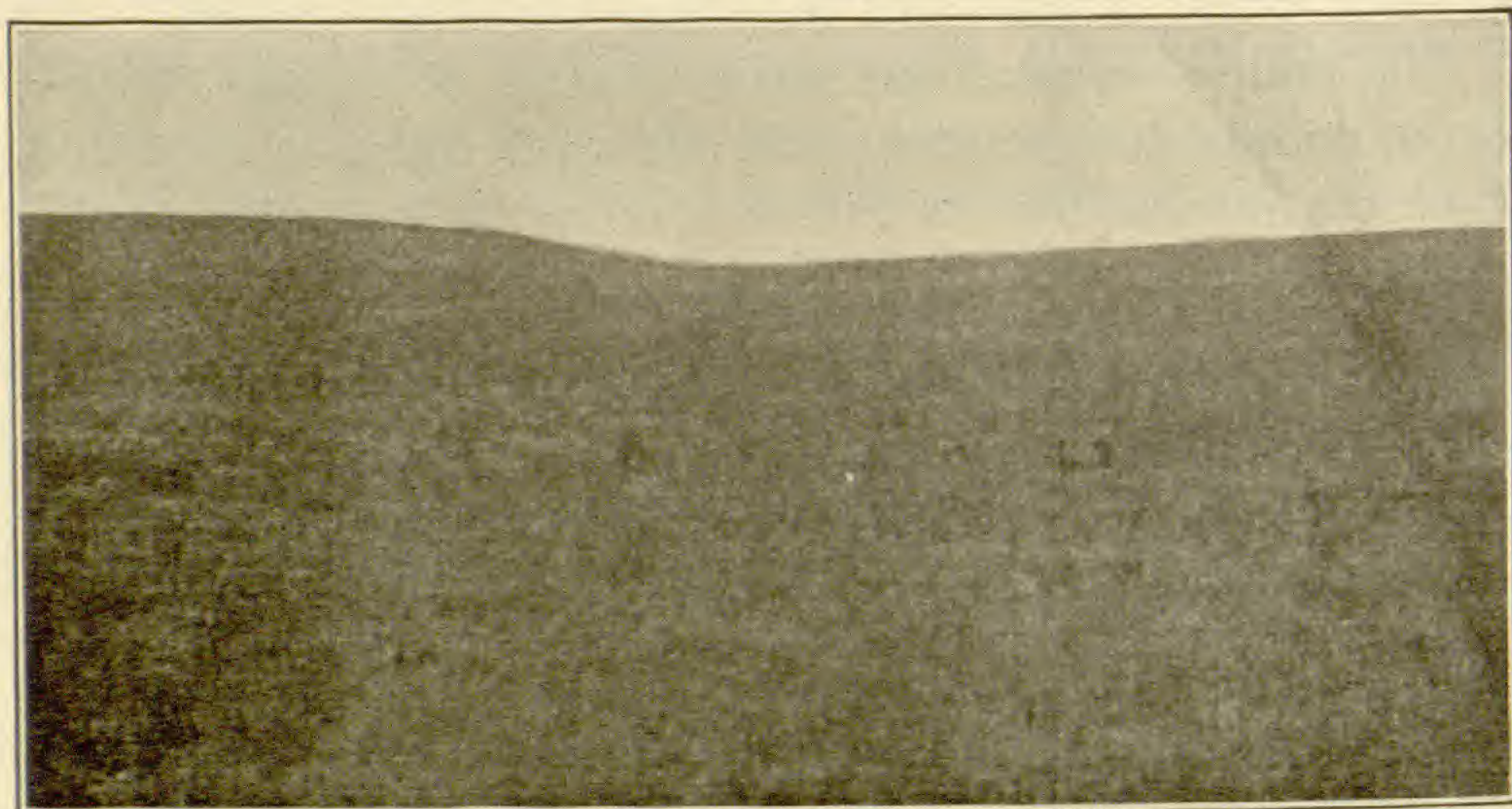


FIG. 3. Looking westward in dry valley about a mile south of Westbury Station. *Eupatorium hyssopifolium* in foreground. Aug. 14, 1909.

The surface of the Hempstead Plains, like the rest of the southern or unglaciated portion of Long Island, is for the most part very flat, and slopes gently southward at the rate of about one foot in 300. It ranges in altitude from about 60 to 200 feet above sea-level. Traversing the plain in a general north and south direction are a number of nearly straight broad shallow valleys, ten to twenty feet in depth, which are believed by geologists to have been formed by glacial streams and not by recent erosion. Within the limits of the prairie most of these valleys are now dry at all seasons, but farther south some of them contain permanent streams.

The upland vegetation of the Plains comprises about four species of trees, a dozen shrubs, sixty herbs, and a few mosses, lichens and fungi. The commonest tree is *Betula populifolia*, which in this region is oftener a shrub than a tree, and the other trees are *Quercus marylandica*, *Q. stellata*, and *Pinus rigida*,

which are scattered sparsely over the eastern part of the area. The shrubs also are most abundant eastward. One of them is a willow, *Salix tristis*, and two are oaks, *Quercus ilicifolia* and *Q. prinoides*; and nearly all grow less than knee-high. The commonest herb is *Andropogon scoparius*, a grass which is said to be also common on some of the western prairies. The herbaceous vegetation, which is almost the only vegetation between Hicksville and Hempstead, with the exception of one ubiquitous shrub, *Pieris Mariana*, covers the ground pretty closely except in the most gravelly areas, is nearly all perennial, and averages about a foot in height.

Although the prairie vegetation grows in comparatively dry and sour soil, and gets about all the sunshine and wind there is in those parts, it exhibits no extreme xerophytic adaptations. A good many species, including several of the most abundant

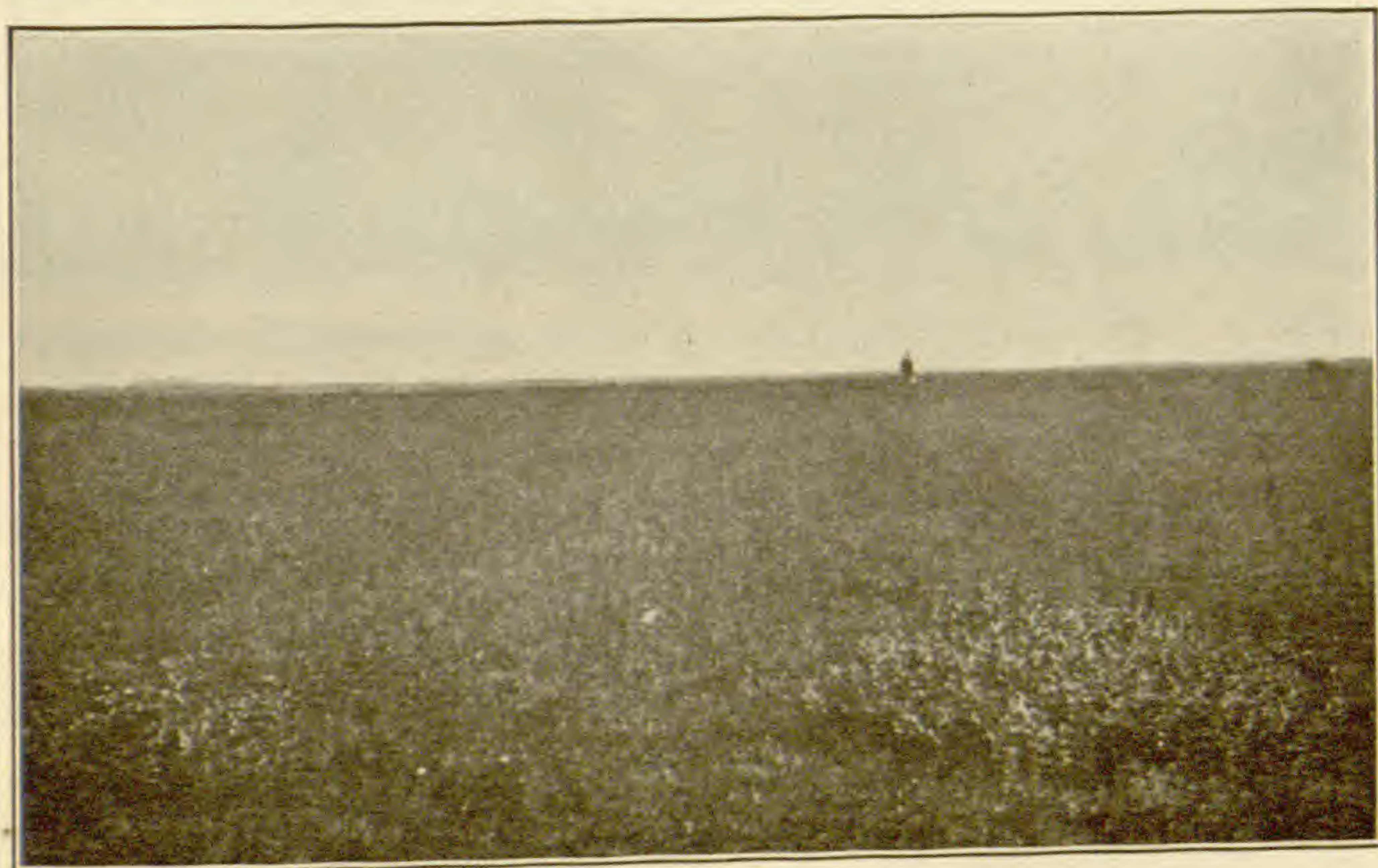


FIG. 4. About a mile east of Garden City, looking eastward. *Salix tristis* in foreground. Sept. 29, 1909.

ones, have decidedly canescent foliage, and about half as many are glaucous, so that the whole landscape has rather a grayish tint. A large proportion of the species have very narrow leaves, but there are no succulents, and very few evergreens. On the other hand there are of course no very large or thin leaves.

Most of the trees and shrubs bloom in spring and most of the herbs in late summer. Most of the woody plants and about one sixth of the species of herbs are wind pollinated. Most of the colored flowers are either white, yellow or purplish, and none of them are very large or noticeably odoriferous. Wind is naturally the chief agent of dissemination, but the scarcity of



FIG. 5. Scene near northeastern corner of the plain, about half way between Hicksville and Syosset, looking approximately ESE. The trees are *Quercus marylandica*. Oct. 20, 1907.

berries and the complete absence of burs, in a region so accessible to birds and mammals, is a little surprising.

The dry prairies just described cover something like 99 per cent of the area. The principal stream in the Plains is East Meadow Brook, which begins gradually, at an indefinite point varying with the wetness of the season, in one of the valleys about three miles east of Mineola and Garden City, flows nearly due south, and enters the woods about a mile from its source. Next in importance is Hempstead Brook, which flows right through the town of Hempstead. It takes its rise in a narrow strip of meadow just above the town, and its dry valley can be traced for a few miles to the northward. Still farther west there are one or two smaller streams similarly situated and bordered originally by similar vegetation, but now considerably encroached

upon by civilization. The wet meadow vegetation along these streams when viewed at a little distance does not differ much in aspect from that of the dry prairies, except that it is taller, many of the shrubs being as high as a man's head and the herbs knee-high. The species in the two habitats are of course almost entirely different, but their numbers happen to be about equal.

This prairie was originally bordered all around by forests, mostly of the oak type, but the border-line has been nearly everywhere obliterated by civilization. At some places south of Hicksville only a single row of fields at present intervenes between the prairie and the oak forest, but in most places the original boundary of the prairie could now hardly be determined within half a mile. Before the country was settled the oaks were presumably encroaching on the prairie from all sides. But in the few places where pine forests border the prairie I have never been able to determine which way the tension-line is tending to move.

The cause of the treelessness of prairies has probably been discussed in geological, semi-popular, and non-botanical literature more than any other strictly botanical problem, and perhaps even more than it has by botanists, but no explanation has yet been found to fit all cases. Some of the partial explanations which have been suggested for the well-known prairies of the upper Mississippi valley will apply as well to the one under consideration, and some will not.* In a paper of such limited scope as this it would be out of place to attempt to review all the prairie theories, or even to mention all who have speculated on the subject; and only the briefest summary can be given here.

Among the western prairie theories which will not apply on Long Island are deficient rainfall, extreme variations of temperature, and impervious subsoil. Our prairie is subject to a good deal of grazing, frequent fires, strong wind, and excessive evaporation, like the western ones, but these factors are the result rather than the cause of treelessness, so that they could hardly have

* The interesting papers of Shimek (*Proc. Ia. Acad. Sci.* 7: 47-59. *pl.* 4. 1900; *Iowa Geol. Survey* 20: 426-474. 1911; *Bull. Lab. Nat. Hist. State Univ. Iowa* 6: 169-240. *pl.* 1-14. April, 1911) and Gleason (*Bull. Torr. Bot. Club* 36: 265-271. 1909) should be examined in this connection.

determined the prairie in the beginning or fixed its present boundaries.

There are two suggestions that have been made with regard to the prairies of the Middle West which deserve more notice, though each leaves much to be explained. Alexander Winchell in 1864* summed up the opinions of most of his predecessors on the subject, indulged in some curious and perhaps not altogether essential observations on the vitality of buried seeds, and con-

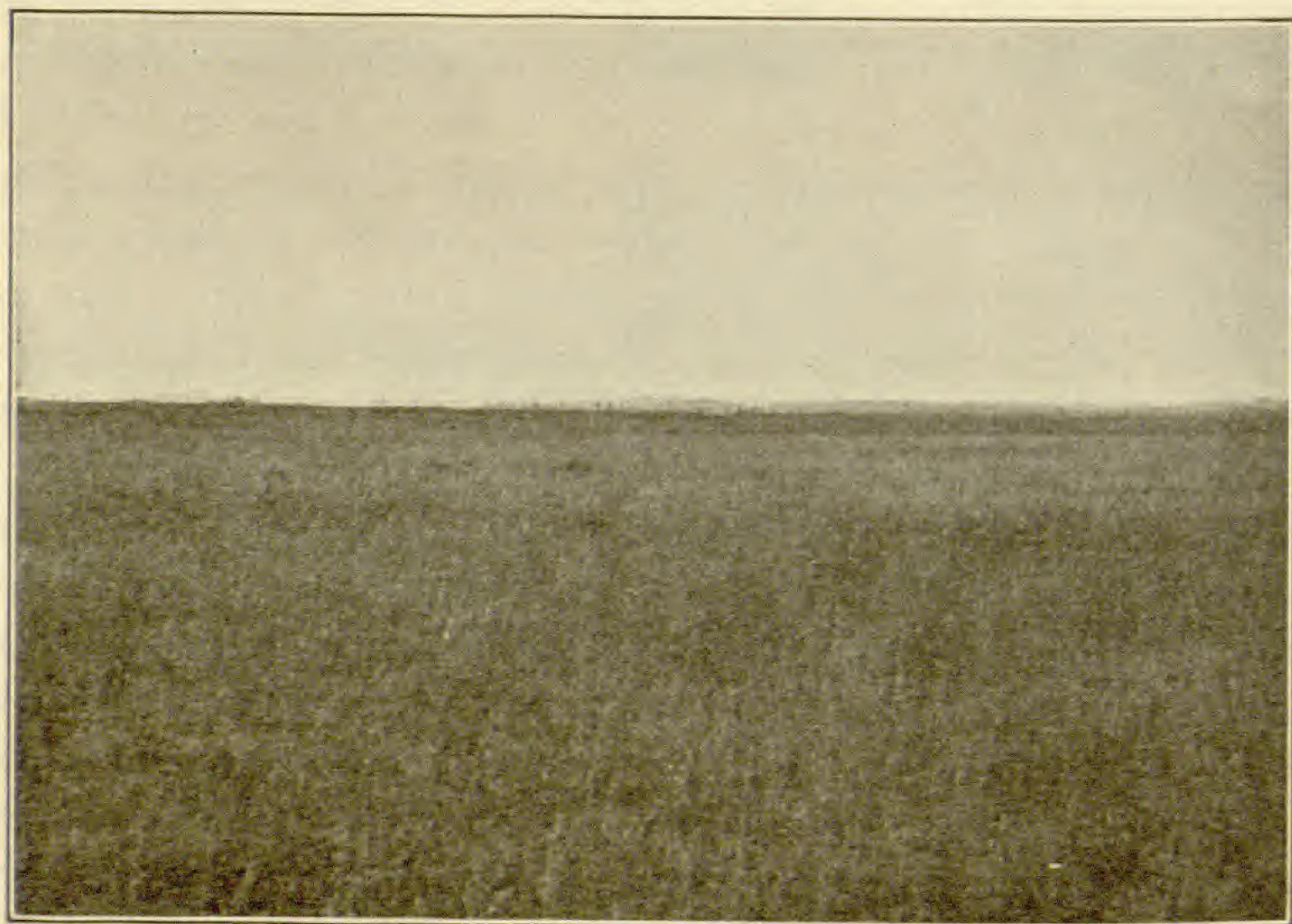


FIG. 6. About two miles east of Hempstead, looking north. Harbor Hill in distance, about 6 miles away. Sept. 27, 1907.

cluded that the "prairies were treeless because the grasses first gained foothold and then maintained it." The same idea has recently been expressed more elaborately by L. H. Harvey.† Prof. J. D. Whitney in 1876‡ distinguished between the arid plains toward the Rocky Mountains and the relatively humid prairies near the Mississippi River, showed the inadequacy of climatic theories to account for the latter, and pointed out that

* Am. Jour. Sci. 88: 332-344, 444-445.

† Bot. Gaz. 46: 86, 297. 1908.

‡ Am. Nat. 10: 577-588, 656-667.

all such areas known to him were characterized by essentially horizontal strata, level surfaces, and finely divided soil. He distinguished between cause and effect, unlike some others who have written on the subject, but admitted his inability to show a causal relation between the conditions he described and the absence of trees. What he said about the topography and soil of the western prairies applies almost as well to those of Long Island* (which he probably knew nothing about), and even to some other kinds of treeless areas, such as wet meadows and salt marshes.

Although the prairies of Long Island are closely correlated with a certain type of soil, it is still an open question whether most of

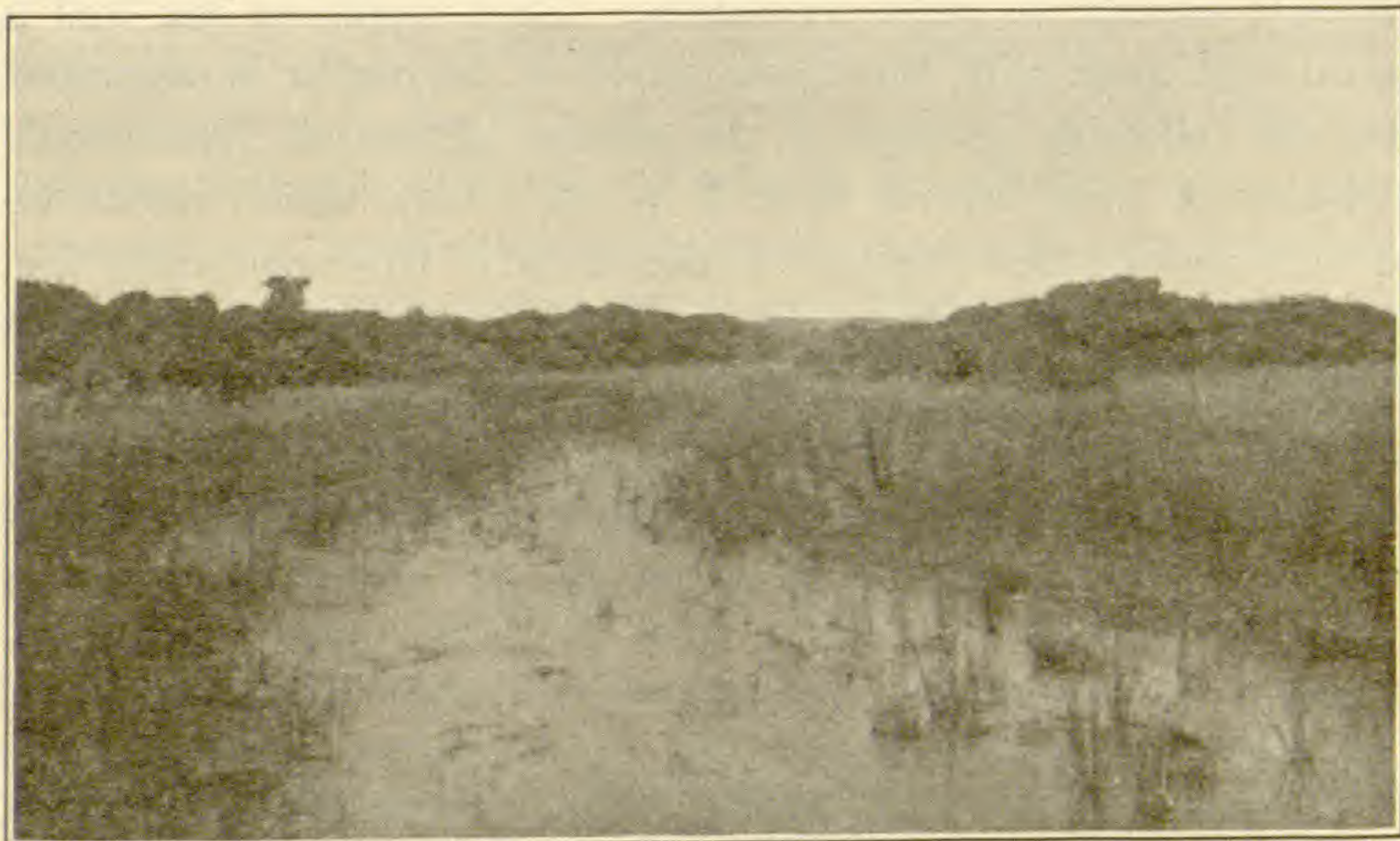


FIG. 7. Looking up East Meadow Brook from the Farmingdale Road, running east from Hempstead. Aug. 25, 1909.

the peculiarities of prairie soil, here and elsewhere, may not be due to long occupation of the same ground by herbaceous vegetation. In its mechanical analysis, and even in its color, the "Hempstead loam" strikingly resembles the "Galveston clay" (an arbitrary name for a well-known type of soil, the salt marsh) described in the same government soil report; but it is probably

* Mechanical analyses of the "Hempstead loam" by the U. S. Soil Survey show that about 76 per cent of it consists of particles less than $1/20$ of a millimeter in diameter, and that less than 3 per cent of it is in particles exceeding a millimeter.

a little too early to jump to the conclusion that the area in question was once a salt marsh while adjoining areas were not.

Not the least interesting fact about this unique insular coastal plain prairie is that so much of it is still in a state of nature, although it is situated in a county which has been settled for 250 years and has about 300 inhabitants to the square mile, and is all within the zone in which it is profitable to haul farm products to New York by wagon. This state of affairs is probably due to a combination of several more or less independent causes. Good crops are raised on the parts that are under cultivation, but the toughness of the sod, the thinness of the soil, and especially the scarcity of water, doubtless operate strongly to keep away new settlers unused to such conditions. That tradition has had a good deal to do with the preservation of the prairie is suggested by the following passage in the second edition of Thompson's *History of Long Island* (Vol. I, p. 29, 1843), which would be almost equally true today: "If the whole of this open waste was disposed of and inclosed in separate fields, the agricultural products of this portion of the island would be nearly doubled. A stupid policy, consequent upon old prejudices, has hitherto prevented any other disposition of it, than as a common pasturage. It is hoped the time is not far distant, when this extensive tract shall abound in waving fields of grain, yielding not only support, but profit, to thousands of hardy and industrious citizens."

Even if no more of this land were taken up in farms, the continued growth of New York City is bound to cover it all with houses sooner or later, and it behooves scientists to make an exhaustive study of the region before the opportunity is gone forever.

No one yet seems to have attempted seriously to enumerate, classify and explain the numerous and various treeless areas of eastern North America. If this were done perhaps other areas similar in character to the one described might be found. There are abundant hints of small prairies, open glades, natural meadows, etc., in early descriptive works dealing with parts of the country that are now pretty thickly settled, and many ex-

amples of them have doubtless already been effectually obliterated, and irrevocably lost to science.

NOTES ON THE FLORA OF NORTHAMPTON COUNTY, PENNSYLVANIA

BY EUGENE A. RAU

Having for a number of years studied the flora in the vicinity of Bethlehem and having made quite a large sized herbarium it was an agreeable surprise for me to notice Mr. King's Flora of Northampton Co., Pa., recently published in TORREYA. In examining the list, however, I detected the omission of a number of plants which I had found at various times, and by reference to my herbarium desire to record the addition of the following together with the addition of a number of habitats.

Apparently much work still remains to be done in recording the flora in all parts of the county and designating the ranges of the various species. A thorough search will doubtless necessitate many additions to the list and thus relieve it of the too local character which it now bears.

ADDITIONS TO PLANTS

- Lycopodium lucidulum* Michx. Hillsides along Monocacy, 1872.
Lycopodium complanatum L. Hillsides, Freemansburg, 1872.
Lycopodium obscurum L. On Lehigh Mt.
Equisetum fluviatile L. In shallow water, Lime Ridge, 1872.
Phegopteris hexagonoptera (Michx.) Fee. In woods, Lehigh Mt., 1871.
Asplenium platyneuron (L.) Oakes. In woods, Lehigh Mt., hillsides near Freemansburg, 1872; along the Bushkill creek, Easton, 1872.
Cystopteris bulbifera (L.) Bernh. On rocks near Illick's mill, 1898; along railroad cut near Bethlehem steel works, 1879.
Batrachium trichophyllum Chaix. Along the Saucon and Monocacy creeks.
Ranunculus obtusiusculus Raf. On small island in Lehigh River near Bethlehem.